**Inequality 1**

1. Prove the inequalty . If , show that

2. Find the solution set for the inequlaity:

Note that .

Case 1 If ,

(a) If , that is

Since , is always true.

is a solution.

(b) If ,

Since , is always false.

There is no solution in this case.

Case 2 If ,

Together with , the solution in this case is .

Combining case 1 and 2, the solution is and .

3. Solve ,

**Method 1**

Since , in order the given inequality to have solution,

If ,

Since , the solution is .

**Method 2**

or

or

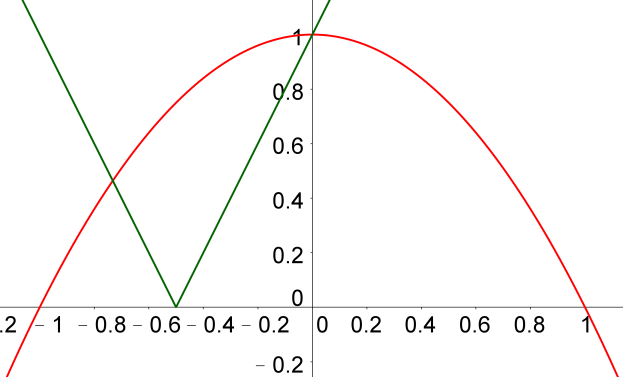
or

.

**4.** Sketch on the same axes, the graphs of and .

Hence, solve the inequality .

Solve :



Solution for

is

**5.** Show that

, where x is real.

**Method 1 (Quadratics)**

Let

Since x is real,

Maximum is . Minimum is .

**Method 2 (Calculus)**

Let

For critical values,

For

For

For

When , y is a minimum,

When , y is a maximum,

Therefore,

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